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Production and/or packaging installation, and method of operating the same

Patent claims

1. Production and/or packaging installation for producing or packaging cigarettes, having a number of production units, namely a maker (10), packer (11), film-wrapping machine (12) and a multipacker (13), each production unit or all the production units being assigned a sensor system (56) provided for picking up performance data, characterized
- 5 by a performance-monitoring device (50), which is provided for scaling the production or packaging performance level which can be retrieved by the installation, with a performance-detecting device (51), a performance-specifying device (38), a comparator (52) and a performance-limiting device (53), it being the case that the performance-specifying device (53) is provided for producing a performance-related desired value (54)
- 10 with reference to the performance level which is guaranteed to an operator of the production and/or packaging installation with respect to the production or packaging performance level that can be retrieved by the installation, that the performance-detecting device (51) is provided for receiving performance data (55) from the sensor system (56) and for producing a performance-related actual value (57) with reference to the
- 15 performance data (55), that the comparator (52) is provided for comparing the performance-related actual value (57) and performance-related desired value (54) and, if the performance-related actual value (57) exceeds the performance-related desired value (54), for generating an activating signal (58) for the performance-limiting device (53), and that a performance-limiting device (53) is provided for reducing the performance level of
- 20 individual production units or of all the production units.

2. Production and/or packaging installation according to Claim 1, **characterized by** a control means (30) which is provided for controlling the production units, the performance-detecting device (51) being provided for receiving performance data (55) from the sensor system (56) and the control means (30) or for evaluation of the performance data (55)
5 from all the production units, namely, if appropriate, the cigarette-production machine (maker 10) and packaging machine (packer 11) and, if appropriate, the film-wrapping machine (12) and multipacker (13).

3. Production and/or packaging installation according to Claim 2, **characterized in that** the performance level of individual production units or of all the production units is
10 reduced by virtue of the control means (30) being influenced, the control means (30) being provided for executing a control program, in accordance with which it is possible to activate the individual production units for carrying out a production or packing process by means of predeterminable output values at outputs (42) of the control means (30), the influencing of the control means (30) comprising the influencing of individual output values
15 or outputs (42).

4. Production and/or packaging installation according to Claim 3, **characterized in that** individual output values or outputs (42) are provided as digital or analog output values or
outputs (42) for activating or deactivating individual actions at the production unit affected by the respective output value or output (42), and that the influencing of individual output
20 values or outputs (42) comprises the activation or deactivation of these output values or outputs (42) which deviates from the activation or deactivation of these output values or outputs (42) by the control program.

5. Method of operating a production and/or packaging installation for producing or packaging cigarettes, having a number of production units, namely a maker (10), packer
25 (11), film-wrapping machine (12) and a multipacker (13), each production unit or all the production units being assigned a sensor system (56) provided for picking up performance data, **characterized in that** a control means (30) assigned to a production unit obtains, from a performance-specifying device (38), a specified performance value which corresponds to a performance level which is guaranteed to an operator of the production
30 and/or packaging installation with respect to the production or packaging performance level that can be retrieved by the installation, namely with respect to a number of non-defective (cigarette) packs – acceptable packs –, or with respect to a number of acceptable packs during a predetermined or predeterminable period of time (T), in that a drive (39) assigned to the production unit is activated in accordance with the specified
35 performance value, in that a speed of the drive (39) is determined and compared with the specified performance value, and in that, in the case of a difference between the specified

performance value and speed determined for the drive (39), predetermined measures are initiated, in particular the drive (39) is switched off or the speed of the drive (39) is reduced.

6. Method according to Claim 5, **characterized in that** speed-related information (37) for subsequent production units in the production process are derived from the specified performance value and transmitted to the production units, in that speed-related feedback (41) is transmitted from the subsequent production units to the control means (30), in that individual pieces of speed-related information (37) or all the pieces of speed-related information (37) are compared with the respectively associated speed-related feedback (41), and in that, in the case of a difference between the speed-related information (37) and associated speed-related feedback (41), predetermined measures are initiated, namely the drive (39) is switched off, the speed of the drive (39) is reduced or the respective production unit is switched off.

7. Method according to Claim 5 or 6, **characterized in that** a drive (39) assigned to the production unit is activated for a predetermined or predeterminable time interval (T) in accordance with a specified performance value, in respect of its speed (n), as follows:

- at the beginning of the time interval, the speed (n) is increased in the direction of a nominal speed (n_{nom}) corresponding to the specified performance value,
- once the nominal speed (n_{nom}) has been reached, the speed (n) is increased further, for a predetermined or predeterminable period of time, up to an excess speed (n_{ex}),
- during the time interval (T), the number of acceptable packs is sensed continuously and compared with nominal production corresponding to the specified performance value,
- the speed (n) being reduced if the number of acceptable packs exceeds a predetermined or predeterminable amount, or the speed (n) being increased if the number of acceptable packs falls below the nominal production by a predetermined or predeterminable amount, and
- production is terminated if the required number of acceptable packs has been reached prior to the end of the time interval (T) or production is continued if the required number of acceptable packs has not been reached at the end of the time interval (T).

8. Method according to Claim 7, **characterized in that** it is possible to change the value of the excess speed (n_{ex}) or of the duration of the production at the excess speed (n_{ex}) –

intended excess production (62) – as a function of the required number of acceptable packs being reached at the end of the time interval (T).

9. Method according to Claim 5, **characterized in that** a brief increase in the specified performance value is provided, the operator acquiring a code in order to achieve the performance-level increase and entering it into the control means (30), the entered code being compared with codes stored in the control means (30) and, in the case of correspondence, the performance-level increase being initiated in accordance with the code.

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List of designations

10	Maker	43	Functional unit
11	Packer	50	Performance-monitoring device
12	Film-wrapping machine	51	Performance-detecting device
13	Multipacker	52	Comparator
14	Cartoner	53	Performance-limiting device
15	Cigarette conveyor	54	Desired value
16	Cigarette store	55	Performance data
17	Blank store	56	Sensor system
18	Pack conveyor	57	Actual value
21	Shipping-carton removal conveyor	58	Activating signal
22	Pack store	60	Outlined region
23	Filter-attachment machine	61	Start-up ramp
24	Material store	62	Excess production
25	Material conveyor	63	Poor pack production
26	Reel	64	Maximum performance level
27	Conveying belt	65	Total discontinuation of operation
30	Control means	66	Graph
31	Bus	70	Counting control means
32	Control means	71	Camera
33	Maker-control means	72	Camera
34	Packer-control means	73	Conveying section
35	Cellophane-control means	74	Testing conveyor
36	Boxer-control means	75	Feed conveyor
37	Speed-related information	76	Cigarette pack
38	Performance-specifying or speed-specifying device	77	Removal conveyor
39	Drive		
40	Resolver		
41	Speed-related feedback		
42	Output		